M2M Research Series

The Future of Autonomous Cars

The Future of Autonomous Cars is a strategy report from Berg Insight analysing the latest developments on the self-driving car market worldwide.

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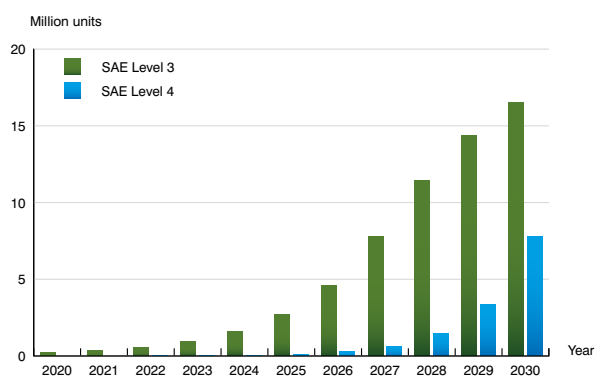
71 million self-driving cars on the roads by 2030

Ever since the introduction of the first automobile one thing has remained constant despite the evolution of performance and appearance – cars have always had a driver. The concept of driverless vehicles opens up for new potential applications as well as business models. In fact, the removal of the driver is arguably the most significant and transformative innovation ever faced by the automotive industry. Some of the potential benefits that follow are safer, more efficient and more convenient journeys. Self-driving cars open up completely new ways to deal with transportation – fleets of autonomous cars could in the future handle entire cities' need for personal mobility with much fewer vehicles than are used today. SAE International has developed a six level standard (0–5), where semi-autonomous functionality starts in the second level. The third level is the first to provide some actual autonomy in the sense that the driver can divert attention from the road although he or she must be able to regain control of the vehicle with some seconds of prior warning. The fourth level provides full autonomy in specific use cases of various complexity.

In 2015, the first semi-autonomous (SAE Level 2) car models were introduced on the market and reached sales of an estimated 194,000 cars. This number is forecasted to increase by almost 57 percent to reach new registrations of about 304,000 Level 2 capable vehicles in 2016. By 2030 an estimated 43 million cars will be sold featuring Level 2 capability and the active installed base will have reached about 177 million cars.

The total number of new registrations of autonomous (SAE Level 3 and 4) cars is forecasted to grow at a compound annual growth rate (CAGR) of 62 percent from 0.2 million units in 2020 to reach 24 million units in 2030. The active installed base of autonomous cars is forecasted to have reached about 71 million at the end of the forecast period. SAE Level 3 and 4 cars will constitute about 16.5 million and 7.8 million of the cars sold in 2030. However, Level 4 sales are expected to overtake Level 3 in the years following 2030. Cars with Level 5 capability are not expected to emerge before 2030 and potentially much later.

There are two approaches to the development of autonomous cars – the evolutionary and the revolutionary. Most of the incumbent car manufacturers are pursuing an evolutionary approach which relies on step-by-step developments. The first step for the evolutionary pathway is to make Level 3 cars available in 2020. This initial system is likely to only feature autonomous mode on freeways. By 2022, the evolutionary approach is expected to reach the next milestone with the rollout of Level 4 capable cars. These cars will be able to drive completely autonomously without ever requesting the driver to intervene but initially only on specific freeways and thus the driver will have to take over control when the car is exiting the freeway. Most of the new entrants like the IT companies as well as startups are instead targeting a revolutionary approach. The revolutionary approach argues that Level 3 is unsafe due to the repeating control exchange between driver and vehicle and therefore aims directly for Level 4 focusing on city-based low-speed autonomous cars. These cars are expected to be introduced in 2022. However, the initial revolutionary Level 4 cars will only be available in specific environments such as in downtown shopping areas.



New registrations of autonomous cars (World 2020–2030)

Most carmakers are today developing autonomous car technology and they are joined by software companies, Tier-1 suppliers, government initiatives and startup firms. The diversity of the actors is important since a range of various technological advancements are necessary along with regulatory changes to realize self-driving cars. Fully autonomous cars are closely related to artificial intelligence and this is therefore one of the most researched fields among carmakers and other institutions working on self-driving vehicle projects. Recent progress in the field of artificial intelligence and specifically in deep learning has made the development of autonomous cars seem more likely to occur soon.

It is important to recognize that autonomous cars will not arrive overnight. Even when a ready solution is available and regulations have been adapted to it, the roll out of self-driving vehicles to the broad market will take many years. The luxury car market will be the first segment to offer autonomous car technologies. This trend can already be seen with automakers like Tesla, BMW and Mercedes-Benz offering autopilot features in their cars. These features, however, are not truly autonomous yet since they require the driver to stay attentive at all times. Moreover, the automakers are starting to see competition from new entrants like Google, Uber and Baidu which all aim to develop self-driving cars.

This report answers the following questions:

- What is the current status of the autonomous car industry?
- Which are the main actors targeting the autonomous car market?
- How will regulatory developments affect the autonomous car market?
- Which are the main drivers and barriers on this market?
- How will autonomous cars impact business models and which are the key benefits?
- How are IT and tech companies positioning themselves in the autonomous car value chain?
- What semi-autonomous cars are available on a commercial basis today?
- What are the automotive OEMs future plans for driverless cars?
- How will the market evolve in Europe, North America, Latin America, Asia-Pacific and MEA?

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About the Authors

Ludvig Barrehag is an M2M/IoT Analyst with a Master's degree in Management and Economics of Innovation from Chalmers University of Technology. His areas of expertise include autonomous cars and related markets and technologies.

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